

MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

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INTRODUCTION.

The MONTHLY WEATHER REVIEW for January, 1901, is based on reports from about 3,100 stations furnished by employees and voluntary observers, classified as follows: regular stations of the Weather Bureau, 159; West Indian service stations, 13; special river stations, 132; special rainfall stations, 48; voluntary observers of the Weather Bureau, 2,562; Army post hospital reports, 18; United States Life-Saving Service, 9; Southern Pacific Railway Company, 96; Canadian Meteorological Service, 32; Mexican Telegraph Service, 20; Mexican voluntary stations, 7; Mexican Telegraph Company, 3. International simultaneous observations are received from a few stations and used, together with trustworthy newspaper extracts and special reports.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Mr. Curtis J. Lyons, Meteorologist to the Hawaiian Government Survey, Honolulu; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Mr. Maxwell Hall, Government Meteorologist, Kingston, Jamaica; Capt. S. I. Kimball, Superintendent of the United States Life-Saving Service; Commander Chapman C. Todd, Hydrographer, United States Navy; H. Pittier, Director of the Physico-Geographic Insti-

tute, San Jose, Costa Rica; Captain François S. Chaves, Director of the Meteorological Observatory, Ponta Delgada, St. Michaels, Azores, and W. M. Shaw, Esq., Secretary, Meteorological Office, London.

Attention is called to the fact that the clocks and self-registers at regular Weather Bureau stations are all set to seventy-fifth meridian or eastern standard time, which is exactly five hours behind Greenwich time; as far as practicable, only this standard of time is used in the text of the REVIEW, since all Weather Bureau observations are required to be taken and recorded by it. The standards used by the public in the United States and Canada and by the voluntary observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. The Hawaiian standard meridian is 157° 30' or 10^h 30^m west of Greenwich. Records of miscellaneous phenomena that are reported occasionally in other standards of time by voluntary observers or newspaper correspondents are sometimes corrected to agree with the eastern standard; otherwise, the local standard is mentioned.

Barometric pressures, whether "station pressures" or "sea-level pressures," are now always reduced to standard gravity, so that they express pressure in a standard system of absolute measures.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

On January 7, 1901, daily forecasts of the direction and force of the wind for the transatlantic steamer tracks west of the fortieth meridian were regularly begun. These forecasts cover the first three days of the passage of steamers eastward bound from United States ports. When the conditions presented by Atlantic and western European reports will permit, forecasts of severe storms in the transatlantic track will be issued for the benefit of vessels about to leave European ports. Forecasts will also be issued in connection with American storms of marked severity when their course to European waters can be calculated.

The storms of January, 1901, were unusually severe over the north Atlantic ocean. During the first ten days of January the barometer was abnormally high over north-central and west-central Europe, and abnormally low over the Mediterranean. This distribution of pressure was attended by exceptionally low temperature over southern Europe and temperature above the seasonal average over northern Europe. During the same period the barometric pressure was unusually low, and severe gales continued over the middle Atlantic ocean, while over the western part of the Atlantic fair weather prevailed. During the second decade of the month heavy gales continued over mid ocean; on the 12th, 16th, and 17th, the pressure was very low over the British Isles; during

this period several severe storms advanced eastward from the American Continent. From the 20th to the close of the month severe storms occurred over the eastern and western portions of the north Atlantic, while over mid ocean the barometer continued generally high. The conditions which prevailed, and the severe gales which occurred over the western Atlantic, were accurately covered by the special daily forecasts of the Weather Bureau.

Severe gales prevailed along and off the Pacific coast of the United States during the first half of month. Due warning was given of the occurrence of these gales by the Weather Bureau offices at San Francisco, Cal., and Portland, Oreg.

During the stormy period of the first half of the month in the Pacific coast States unusually heavy falls of snow delayed trains and interrupted telegraphic communication. In parts of central and southern California the snowfalls of the month were the heaviest in years.

Moderate temperatures for the season prevailed generally east of the Pacific coast States. On the 2d killing frost occurred in central California, and at San Luis Obispo the minimum temperature, 24°, was the lowest on record at that place. On the 9th frost occurred generally throughout southern California. On the 18th special warnings of continued low temperature and strong north winds, with snow in the mountain

districts, were sent to Arizona. Commenting upon the forecasts of the early part of the month, the Riverside, Cal., Independent, of January 9, 1901, remarks editorially as follows:

The Weather Bureau's reports and predictions this season so far have been remarkably accurate, and their value can hardly be overestimated.

Frosts occurred at intervals during the month in the Gulf and extreme south Atlantic coast districts. In each instance all interests in the districts referred to received timely and accurate forecasts and warnings of approaching frost or freezing weather.

From the 8th to the 20th heavy rain and melting snow caused freshets and floods in the rivers of the Pacific coast States. During the second decade of the month rapid rises occurred in the Coosa, Alabama, and Tennessee rivers. Warnings were sent well in advance of the flood crests, and were of great benefit to property interests affected by the rapid rise in the rivers.

CHICAGO FORECAST DISTRICT.

With the exception of a cold wave which overspread the district on the 1st of January, for which warnings had been sent out well in advance, the month was marked by moderate temperature. On two or three occasions later in the month cold waves appeared in the Northwest, but they lost force before extending over a large part of the district.

There were some moderate snowfalls during the month but no warnings of heavy snows were issued.

Advisory messages were sent to all open ports on Lake Michigan several times when high winds threatened. No casualties on the lakes were reported during the month.—*H. J. Cox, Professor.*

SAN FRANCISCO FORECAST DISTRICT.

On January 1 special warnings of heavy frost were sent to fruit growers in southern California. On the morning of the 2d killing frosts were reported in central California, and a minimum of 24° was reported at San Luis Obispo. Frost warnings were issued on the 9th for southern California, and citrus fruit growers were warned to smudge vigorously. Heavy frosts were reported at nearly every point, with ice at some stations. Warnings or advisory messages regarding gales were telegraphed to coast stations during the early part of the month; on the morning of the 3d unusually high winds occurred at many points in California. At San Francisco a maximum wind velocity of 56 miles an hour was registered. Shipping interests had been well informed of the approach of the storm, and probably the small list of casualties is due in some measure to precautions taken, based upon warnings given.—*A. G. McAdie, Forecast Official.*

PORTLAND, OREG., FORECAST DISTRICT.

The first half of the month was especially noteworthy for the large amount of snow which fell in the mountains of southern Oregon. During this period severe storms occurred at sea, but in every instance warnings were issued in ample time to be of benefit, and no marine disasters, due to high winds, are known to have occurred during January. Heavy rains and melting snow in the foothills resulted in a small freshet in the Willamette River and tributaries between the 13th and 20th of the month. River forecasts were issued twice a day during the freshet, and while considerable damage was done in the streams above Portland to log rafts, small

bridges, etc., at Portland the damage was small and consisted principally of money expended in hiring extra labor to remove goods from cellars and wharfs to higher places. The maximum stage reached at Portland was 20.9 feet on the 17th. This stage at Portland would, if unannounced, result in damaging goods stored in cellars and on low wharfs to the extent of nearly, if not quite, a million dollars, but in this instance the damage was not worth noting, and this state of affairs was largely due to the flood warnings which were sufficiently reliable to enable nearly every one to remove his goods before the water reached them.—*Edward A. Beals, Forecast Official.*

AREAS OF HIGH AND LOW PRESSURE.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
High areas.										
I.....	3, a. m.	53	108	6, p. m.	39	75	1, 975	2.5*	790	32.0
II.....	5, p. m.	51	114	8, a. m.	39	75	2, 100	2.5	840	35.0
III.....	7, p. m.	51	114	11, a. m.	47	65	2, 325	3.5	664	27.7
IV.....	11, p. m.	32	96	18, a. m.	39	82	950	1.5	633	26.4
V.....	16, a. m.	54	114	17, a. m.	47	101	750	1.0	750	31.2
VI.....	18, a. m.	28	97	20, p. m.	32	65	2, 375	2.0†	1, 188	49.5
VII.....	20, p. m.	48	115	23, a. m.	46	60	2, 900	2.5	1, 160	45.3
VIII.....	22, p. m.	46	123	26, a. m.	39	82	2, 625	3.5	750	31.2
IX.....	31, p. m.	30	91	2, a. m.‡	30	82	2, 250	3.5	643	25.9
							825	1.5	617	25.7
Sums.....							19, 175	34.0	8, 035	334.8
Mean of 10 paths.....							1, 918		804	33.5
Mean of 24 days.....									799	33.3
Low areas.										
I.....	5, a. m.	48	125	10, a. m.	48	54	4, 025	4.0*	1, 006	41.9
II.....	5, p. m.	38	105	7, p. m.	45	67	2, 250	2.0	1, 125	45.9
III.....	8, a. m.	45	118	10, p. m.	43	73	2, 225	2.5	890	37.1
IV.....	8, p. m.	33	106	14, a. m.	48	54	3, 325	5.5	605	25.2
V.....	10, p. m.	48	125	12, a. m.	50	97	1, 450	1.5	907	40.3
VI.....	12, a. m.	48	125	15, a. m.	46	82	2, 200	3.0	733	30.5
	13, a. m.	53	122				3, 750	6.0	625	26.0
VII.....	14, p. m.	49	110	19, a. m.	48	54	3, 200	4.5	711	29.6
	17, a. m.	37	80				1, 725	2.0	952	35.9
VIII.....	17, a. m.	54	114	19, a. m.	42	75	2, 200	2.0	1, 100	45.8
IX.....	18, p. m.	53	114	22, a. m.	48	54	2, 525	3.5	807	33.6
	19, p. m.	54	114				3, 000	2.5	1, 200	50.0
X.....	21, p. m.	54	114				4, 375	8.5	515	21.5
	23, a. m.	20	76	30, a. m.	45	55	3, 200	8.0	412	17.2
	23, a. m.	35	96				3, 150	7.0	450	18.8
XI.....	24, a. m.	53	123	26, p. m.	48	85	1, 775	2.5	710	29.6
XII.....	25, a. m.	34	112	26, p. m.	35	93	1, 150	1.5	707	32.0
	27, p. m.	54	114				3, 575	4.5	861	35.9
XIII.....	27, a. m.	33	118	1, a. m.‡	42	60	3, 500	5.0	700	29.2
	29, a. m.	26	97				2, 475	3.0	825	34.4
Sums.....							55, 775	79.0	15, 571	661.4
Mean of 30 paths.....							2, 789		794	33.1
Mean of 79 days.....									706	29.4

* Stationary for 1 day. † Stationary for half day. ‡ February.

RIVERS AND FLOODS.

With the exception of the Tennessee and Cumberland, the rivers of the Mississippi system were lower than during December, 1900, though not decidedly so. Below Cairo, Ill., the Mississippi River fell during the first half of the month, but was considerably higher during the last half, a rise from the Ohio reaching it on the 13th.

Low water caused a suspension of navigation between St. Louis, Mo., and Cairo, Ill., until the 14th, when it was resumed after an interruption of 23 days.

The Mississippi was frozen over during the entire month to below LeClaire, Iowa, and floating ice was observed as far south as Cairo, Ill., on the 2d and 3d. At Hannibal, Mo., the ice